## REMARKS

Claims 1 - 8 and 12 - 23 are pending in the above-identified application. Claim 12 is withdrawn from consideration.

In the Office Action of June 16, 2003, Claims 1 - 8 and 13 - 23 were rejected. No claim was allowed. In response, Claims 1 - 4, 6 - 8, 13 - 16 and 18 - 22 are amended. Reexamination and reconsideration are respectfully requested in view of the foregoing amendments and the following remarks.

**Rejection of Claims 1 - 8 and 13 - 22 under 35 U.S.C. §112, first paragraph**

Claims 1 - 8 and 13 - 22 were rejected under 35 U.S.C. §112, first paragraph, on the alleged grounds that the claims have been amended to require that the substrate be heated to a temperature below 230 °C, whereas the specification teaches heating to a temperature below 200 °C. In response, the previously amended claims are amended to require that the substrate be heated to a temperature below 200 °C.

Accordingly, it is respectfully submitted that the rejection under 35 U.S.C. §112, first paragraph, is thereby overcome.

**Rejection of Claim 4 under 35 U.S.C. §112, first paragraph**

Claim 4 is rejected under 35 U.S.C. §112, first paragraph, on the alleged grounds that the amendment to change "fluorine nitric acid" to "fluoric and nitric acid is new matter. The Examiner alleges that the recitation of "fluoric or nitric acid" is not in the original Japanese priority document.

In response, Claim 4 is amended to recite "a mixture of hydrofluoric and nitric

acid". Applicants respectfully submit that the original term "fluorine nitric acid", a direct translation from Japanese, is an abbreviated term that would be understood by persons in the semiconductor manufacturing industry in Japan to refer to a mixture of hydrofluoric acid (HF) and nitric acid ($HNO_3$). The same term is used, for example, in JP-A-2-224233, which is referred to in on page 2 of the present application.

Accordingly, withdrawal of the rejection under 35 U.S.C. §112, first paragraph, is respectfully requested.

**Rejection of Claims 1 - 7 under 35 U.S.C. §103(a) over O'Donnell in view of Page**

Claims 1 - 7 were rejected under 35 U.S.C. §103(a) as obvious over O'Donnell in view of Page et al (U.S. Patent No. 5,269,035). The Examiner alleges that O'Donnell teaches a method of etching a layer comprising a transition metal using a plasma containing chlorine and argon while maintaining the temperature of the substrate support at 40°C, followed by a second step of rinsing the substrate with 90°C deionized water to remove chlorine residue from the substrate and that O'Donnell teaches that the metal layer may be patterned by etching through a patterned photoresist mask. The Examiner acknowledges that O'Donnell does not teach using a hot plate to dry the substrate after it has been rinsed with water, but alleges that this is taught by Page. The Examiner takes the position that it would have been obvious to dry the substrate using a hot plate because Page teaches that this is the typical method of drying substrates. The Examiner further takes the position that it would have been obvious to heat at a temperature of less than 230 °C

because it is well known that the magnetic properties of the materials are destroyed at higher temperatures.

This rejection is respectfully traversed. The method of the present invention differs from that of O'Donnell in that O'Donnell fails to teach or suggest a drying step by forced heating of a body to be treated by placing it on a hot plate.

The present invention is directed to solving the problem that, when a transition metal such as NiFe is etched by a $Cl_2$ series gas, corrosion can be comparatively severe, and this corrosion cannot be prevented by simple water rinsing. It has been found that if, immediately after water rinsing, the rinsed body is placed on a hot plate at about 200 °C to drive away residual water, complete corrosion prevention can be achieved. The comparative benefits of the present method are shown, for example, on page 22, line 25 to page 23, line 6 of the substitute specification.

Moreover, it is shown that the greatest benefits are obtained if the rinsing and drying are carried out immediately after etching, as shown, for example on page 6, line 17 to page 7, line 2 page 19, lines 9 - 10 and page 22, line 25 to page 23, line 6 of the substitute specification. Accordingly, the process of the present invention is connected in-line to the hot plate, so that the immediately after etching, the etched body is immediately rinsed and then immediately thereafter is dried on a hot plate at a temperature below 200 °C.

The method of the present invention is neither taught nor suggested by the cited references. O'Donnell, in column 1, lines 23 - 40, explains in detail that the traditional techniques of etching an aluminum metal layer typically do not work well for the transition metal-containing layer. However, the solution proposed in

O'Donnell for overcoming the corrosion problem of the transition metal-containing layer after etching is to use a plasma source gas including HCl and Ar.

Page is directed to plasma etching of a metal layer including a lower titanium-tungsten adhesive sublayer, a copper/aluminum bulk conductor sublayer, and an upper titanium-tungsten adhesive sublayer. Unlike the present invention and O'Donnell, Page is not directed to the etching of a lamination layer including a NiFe alloy layer or an NiFeCo alloy layer. Accordingly, there is no motivation to combine the teachings of Page regarding etching methods of different materials with the teachings of O'Donnell.

Moreover, the modification suggesting the use of a hot plate in Page to bake a wafer following spraying, as the Examiner alleges is taught in column 4, line 50 - 53 of Page, is contradicted by the indication in column 2, lines 38 - 44 of Page wherein it is indicated that an advantage of the method of Page is that a hot plate, rinse bath and spin dryer do not have to be used.

Accordingly, it is respectfully submitted that the Claims 1 - 7 would not have been obvious over O'Donnell or Page, alone or in combination.

**Rejection of Claim 8 under 35 U.S.C. §103(a) over O'Donnell and Page in view of Takagi**

Claim 8 was rejected under 35 U.S.C. §103(a) over O'Donnell and Page in view of Takagi (U.S. Patent No. 5,520,716). O'Donnell is applied for the same reasons given above with respect to Claim 1. The Examiner further alleges that O'Donnell teaches that the method is useful in the fabrication of magnetic heads. The Examiner acknowledges that O'Donnell does not teach that the

PERMALLOYTM layer being etched is on a sintered $Al_2O_3$/TiC substrate. The Examiner alleges that Takagi teaches a sintered $Al_2O_3$/TiC substrate and takes the position that it would have been obvious to use a sintered $Al_2O_3$/TiC substrate when applying the method of O'Donnell to the fabrication of a magnetic head.

This rejection is traversed as it may apply to the claims as amended herein. As discussed above, there is no teaching in the combined references for a method wherein, following etching including a layer containing a NiFe alloy layer or an NiFeCo alloy layer, the etched body is immediately rinsed and dried at a temperature below 200 °C. As discussed above, Page and O'Donnell are not properly combinable to teach these limitations, and further, Takagi does not teach any method steps wherein an etched body is immediately rinsed and then is dried by placing it on a hot plate and heating it at a temperature below 200 °C after the rinsing step. This feature is neither disclosed nor suggested by O'Donnell, Page or Takagi.

Accordingly, it is respectfully submitted that Claim 8 would not have been obvious over O'Donnell, Page or Takagi, alone or in combination.

**Rejection of Claim 14 under 35 U.S.C. §103(a) over Otsuka in view of O'Donnell and further in view of Page**

Claim 14 was rejected under 35 U.S.C. §103(a) over O'Donnell in view of Otsuka (U.S. Patent No. 6,282,776). The Examiner alleges that Otsuka teaches a method of fabricating a magnetic head comprising each of the component layers recited in the claims and that the method includes etching the seed layer and then plasma etching the gap layer with a Cl or F containing gas. The Examiner

acknowledges that Otsuka does not teach removing chlorine or fluorine residue with a liquid rinse. The Examiner takes the position that it would have been obvious to remove chlorine fluorine residues with a liquid rinse and that it would have been obvious to dry the substrate using a hot plate because Page teaches that that this is the typical method of drying substrates.

This rejection is traversed. As discussed above, Page is directed to plasma etching of a metal layer including a lower titanium-tungsten adhesive sublayer, a copper/aluminum bulk conductor sublayer, and an upper titanium-tungsten adhesive sublayer. Unlike the present invention and O'Donnell and Otsuka, Page is not directed to the etching of a lamination layer including a NiFe alloy layer or an NiFeCo alloy layer. Accordingly, there is no motivation to combine the teachings of Page regarding etching methods of different materials with the teachings of O'Donnell and Otsuka.

Moreover, Claim 14 is amended to provide that the rinsed body is dried by placing it on a hot plate after the rinsing step and heating it at a temperature below about 200 °C. As discussed above, this feature is neither disclosed nor suggested by O'Donnell, Page or Otsuka.

Accordingly, it is respectfully submitted that Claim 14 would not have been obvious over O'Donnell, Page or Otsuka, alone or in combination.

**Rejection of Claims 13, 15 - 18, 20, 22 and 23 under 35 U.S.C. §103(a) over Otsuka in view of O'Donnell and Page and further in view of Ichihara**

Claims 13, 15 - 18, 20, 22 and 23 were rejected under 35 U.S.C. §103(a) over Otsuka in view of O'Donnell and Page and further in view of Ichihara (U.S. Patent

No. 5,607,599). The Examiner's allegations with respect to Otsuka, O'Donnell and Page are the same as those set forth with respect to Claim 14, above. The Examiner acknowledges that Otsuka does not teach etching the seed or shield layers with argon and chlorine, but alleges that etching NiFe allow layers such as seed or shield layers with an argon and chlorine plasma is taught by Ichihara. The Examiner alleges that it would have been obvious to use the plasma etching method of Ichihara.

This rejection is traversed. As discussed above, Page is directed to plasma etching of a metal layer including a lower titanium-tungsten adhesive sublayer, a copper/aluminum bulk conductor sublayer, and an upper titanium-tungsten adhesive sublayer. Unlike the present invention and O'Donnell and Otsuka, Page is not directed to the etching of a lamination layer including a NiFe alloy layer or an NiFeCo alloy layer. Accordingly, there is no motivation to combine the teachings of Page regarding etching methods of different materials with the teachings of O'Donnell and Otsuka.

As discussed above, this feature is neither disclosed nor suggested by Otsuka, O'Donnell, Page or Ichihara..

Accordingly, it is respectfully submitted that Claims 13, 15 - 18, 20, 22 and 23 would not have been obvious over Otsuka, O'Donnell, Page or Ichihara, alone or in combination.

**Conclusion**

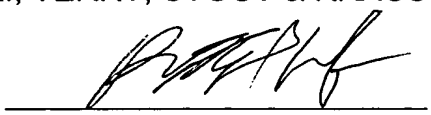
In view of the foregoing amendments and remarks, it is respectfully submitted that Claims 1 - 8 and 13 - 23 are in condition for allowance. Favorable

reconsideration is respectfully requested.

Should the Examiner believe that anything further is necessary to place this application in condition for allowance, the Examiner is requested to contact applicants' undersigned attorney at the telephone number listed below.

Kindly charge any additional fees due, or credit overpayment of fees, to Deposit Account No. 01-2135 (503.38156X00).

Respectfully submitted,
ANTONELLI, TERRY, STOUT & KRAUS



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